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#19

| RAW SEQUENCE LISTING | DATE: 04/25/2003 |
| PATENT APPLICATION: **US/09/596,958A** | TIME: 14:44:32 |

Input Set : **A:\C32861.app**
Output Set: **N:\CRF4\04252003\I596958A.raw**

P.6

ENTERED

```
 3 <110> APPLICANT: Kim, Jihyun Francis
 4        Beer, Steven V.
 6 <120> TITLE OF INVENTION: HYPERSENSITIVE RESPONSE ELICITOR FROM ERWINIA AMYLOVORA
 7        AND ITS USE
 9 <130> FILE REFERENCE: 19603/3286
11 <140> CURRENT APPLICATION NUMBER: 09/596,958A
12 <141> CURRENT FILING DATE: 2000-06-20
14 <150> PRIOR APPLICATION NUMBER: 09/120,927
15 <151> PRIOR FILING DATE: 1998-07-22
17 <150> PRIOR APPLICATION NUMBER: 60/055,108
18 <151> PRIOR FILING DATE: 1997-08-06
20 <160> NUMBER OF SEQ ID NOS: 10
22 <170> SOFTWARE: PatentIn Ver. 2.1
24 <210> SEQ ID NO: 1
25 <211> LENGTH: 1344
26 <212> TYPE: DNA
27 <213> ORGANISM: Erwinia amylovora
29 <400> SEQUENCE: 1
30 atgtcaattc ttacgcttaa caacaatacc tcgtcctcgc cgggtctgtt ccagtccggg 60
31 ggggacaacg ggcttggtgg tcataatgca aattctgcgt tggggcaaca acccatcgat 120
32 cggcaaacca ttgagcaaat ggctcaatta ttggcggaac tgttaaagtc actgctatcg 180
33 ccacaatcag gtaatgcggc aaccggagcc ggtggcaatg accagactac aggagttggt 240
34 aacgctggcg gcctgaacgg acgaaaaggc acagcaggaa ccactccgca gtctgacagt 300
35 cagaacatgc tgagtgagat gggcaacaac gggctggatc aggccatcac gcccgatggc 360
36 cagggcggcg ggcagatcgg cgataatcct ttactgaaag ccatgctgaa gcttattgca 420
37 cgcatgatgg acggccaaag cgatcagttt ggccaacctg gtacgggcaa caacagtgcc 480
38 tcttccggta cttcttcatc tggcggttcc cctttttaacg atctatcagg ggggaaggcc 540
39 ccttccggca actccccttc cggcaactac tctcccgtca gtaccttctc acccccatcc 600
40 acgccaacgt ccccctacctc accgcttgat ttcccttctt ctcccaccaa agcagccggg 660
41 ggcagcacgc cggtaaccga tcatcctgac cctgttggta gcgcgggcat cggggccgga 720
42 aattcggtgg ccttcaccag cgccggcgct aatcagacgg tgctgcatga caccattacc 780
43 gtgaaagcgg gtcaggtgtt tgatggcaaa ggacaaacct tcaccgccgg ttcagaatta 840
44 ggcgatggcg gccagtctga aaaccagaaa ccgctgttta tactggaaga cggtgccagc 900
45 ctgaaaaacg tcaccatggg cgacgacggg gcggatggta ttcatcttta cggtgatgcc 960
46 aaaatagaca atctgcacgt caccaacgtg ggtgaggacg cgattaccgt taagccaaac 1020
47 agcgcgggca aaaaatccca cgttgaaatc actaacagtt ccttcgagca cgcctctgac 1080
48 aagatcctgc agctgaatgc cgatactaac ctgagcgttg acaacgtgaa ggccaaagac 1140
49 tttggtactt ttgtacgcac taacggcggt caacagggta actgggatct gaatctgagc 1200
50 catatcagcg cagaagacgg taagttctcg ttcgttaaaa gcgatagcga ggggctaaac 1260
51 gtcaatacca gtgatatctc actgggtgat gttgaaaacc actacaaagt gccgatgtcc 1320
52 gccaacctga aggtggctga atga 1344
55 <210> SEQ ID NO: 2
56 <211> LENGTH: 447
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RAW SEQUENCE LISTING   DATE: 04/25/2003
PATENT APPLICATION: US/09/596,958A   TIME: 14:44:33

Input Set : A:\C32861.app
Output Set: N:\CRF4\04252003\I596958A.raw

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57 <212> TYPE: PRT
58 <213> ORGANISM: Erwinia amylovora
60 <400> SEQUENCE: 2
61 Met Ser Ile Leu Thr Leu Asn Asn Asn Thr Ser Ser Ser Pro Gly Leu
62  1               5                   10                  15
64 Phe Gln Ser Gly Gly Asp Asn Gly Leu Gly Gly His Asn Ala Asn Ser
65              20                  25                  30
67 Ala Leu Gly Gln Gln Pro Ile Asp Arg Gln Thr Ile Glu Gln Met Ala
68          35                  40                  45
70 Gln Leu Leu Ala Glu Leu Leu Lys Ser Leu Leu Ser Pro Gln Ser Gly
71      50                  55                  60
73 Asn Ala Ala Thr Gly Ala Gly Gly Asn Asp Gln Thr Thr Gly Val Gly
74  65                  70                  75                  80
76 Asn Ala Gly Gly Leu Asn Gly Arg Lys Gly Thr Ala Gly Thr Thr Pro
77                  85                  90                  95
79 Gln Ser Asp Ser Gln Asn Met Leu Ser Glu Met Gly Asn Asn Gly Leu
80              100                 105                 110
82 Asp Gln Ala Ile Thr Pro Asp Gly Gln Gly Gly Gly Gln Ile Gly Asp
83          115                 120                 125
85 Asn Pro Leu Leu Lys Ala Met Leu Lys Leu Ile Ala Arg Met Met Asp
86      130                 135                 140
88 Gly Gln Ser Asp Gln Phe Gly Gln Pro Gly Thr Gly Asn Asn Ser Ala
89 145                 150                 155                 160
91 Ser Ser Gly Thr Ser Ser Ser Gly Gly Ser Pro Phe Asn Asp Leu Ser
92              165                 170                 175
94 Gly Gly Lys Ala Pro Ser Gly Asn Ser Pro Ser Gly Asn Tyr Ser Pro
95              180                 185                 190
97 Val Ser Thr Phe Ser Pro Pro Ser Thr Pro Thr Ser Pro Thr Ser Pro
98              195                 200                 205
100 Leu Asp Phe Pro Ser Ser Pro Thr Lys Ala Ala Gly Gly Ser Thr Pro
101      210                 215                 220
103 Val Thr Asp His Pro Asp Pro Val Gly Ser Ala Gly Ile Gly Ala Gly
104 225                 230                 235                 240
106 Asn Ser Val Ala Phe Thr Ser Ala Gly Ala Asn Gln Thr Val Leu His
107              245                 250                 255
109 Asp Thr Ile Thr Val Lys Ala Gly Gln Val Phe Asp Gly Lys Gly Gln
110              260                 265                 270
112 Thr Phe Thr Ala Gly Ser Glu Leu Gly Asp Gly Gly Gln Ser Glu Asn
113          275                 280                 285
115 Gln Lys Pro Leu Phe Ile Leu Glu Asp Gly Ala Ser Leu Lys Asn Val
116      290                 295                 300
118 Thr Met Gly Asp Asp Gly Ala Asp Gly Ile His Leu Tyr Gly Asp Ala
119 305                 310                 315                 320
121 Lys Ile Asp Asn Leu His Val Thr Asn Val Gly Glu Asp Ala Ile Thr
122              325                 330                 335
124 Val Lys Pro Asn Ser Ala Gly Lys Lys Ser His Val Glu Ile Thr Asn
125              340                 345                 350
127 Ser Ser Phe Glu His Ala Ser Asp Lys Ile Leu Gln Leu Asn Ala Asp
128          355                 360                 365
```

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PATENT APPLICATION: US/09/596,958A   TIME: 14:44:33

Input Set : A:\C32861.app
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```
130 Thr Asn Leu Ser Val Asp Asn Val Lys Ala Lys Asp Phe Gly Thr Phe
131     370             375             380
133 Val Arg Thr Asn Gly Gly Gln Gln Gly Asn Trp Asp Leu Asn Leu Ser
134 385             390             395                 400
136 His Ile Ser Ala Glu Asp Gly Lys Phe Ser Phe Val Lys Ser Asp Ser
137             405             410             415
139 Glu Gly Leu Asn Val Asn Thr Ser Asp Ile Ser Leu Gly Asp Val Glu
140             420             425             430
142 Asn His Tyr Lys Val Pro Met Ser Ala Asn Leu Lys Val Ala Glu
143         435             440             445
146 <210> SEQ ID NO: 3
147 <211> LENGTH: 31
148 <212> TYPE: DNA
149 <213> ORGANISM: Erwinia amylovora
151 <220> FEATURE:
152 <221> NAME/KEY: unsure
153 <222> LOCATION: (8)
154 <223> OTHER INFORMATION: n at any position is unknown
156 <400> SEQUENCE: 3
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W--> 157 cggaaccnnn ncnnnnnnnn nnccactcaa t   31

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160 <210> SEQ ID NO: 4
161 <211> LENGTH: 242
162 <212> TYPE: PRT
163 <213> ORGANISM: Fusarium solani f. sp. pisi
165 <400> SEQUENCE: 4
166 Met Lys Phe Thr Ala Ala Phe Val Ala Ala Leu Val Gly Thr Ser Ser
167 1             5             10             15
169 Ala Ala Val Thr Lys Thr Leu Pro Lys Ser Ala Gly Ala Thr Ser Phe
170             20             25             30
172 Pro Thr Ala Val Pro Val Lys Gly Ser Tyr Asp Gly Gly Met Lys Arg
173             35             40             45
175 Phe Glu Arg Glu Pro Lys Val Cys Lys Gly Gln Asp Glu Thr Gly Glu
176     50             55             60
178 Lys Asp Ala Met Phe Ile Leu Glu Asn Gly Ala Thr Leu Ser Asn Val
179 65             70             75             80
181 Ile Ile Gly Ala Ser Gln Ala Glu Gly Val His Cys Lys Gly Thr Cys
182             85             90             95
184 Thr Leu Asn Asn Val Trp Trp Ala Asp Val Cys Glu Asp Ala Val Thr
185             100             105             110
187 Leu Lys Gln Thr Ser Gly Thr Ser Tyr Ile Asn Gly Gly Gly Ala Phe
188             115             120             125
190 His Ala Ser Asp Lys Ile Ile Gln Phe Asn Gly Arg Gly Thr Val His
191     130             135             140
193 Val Lys Asp Phe Tyr Ala Glu Asp Tyr Gly Lys Leu Ser Arg Ser Cys
194 145             150             155             160
196 Gly Asn Cys Lys Asp Asn Gly Gly Pro Arg Asn Val Ile Val Glu Asn
197             165             170             175
199 Ser Val Ala Val Asp Gly Gly Val Leu Cys Gly Ile Asn Thr Asn Tyr
200             180             185             190
```

RAW SEQUENCE LISTING
PATENT APPLICATION: **US/09/596,958A**

DATE: 04/25/2003
TIME: 14:44:33

Input Set : A:\C32861.app
Output Set: N:\CRF4\04252003\I596958A.raw

```
202 Gly Asp Thr Cys Lys Val Ile Asn Ser Cys Gln Asp Lys Gly Lys Tyr
203       195             200           205
205 Cys Asp Arg Tyr Glu Gly Asn Ser Ser Gly Lys Glu Pro Thr Lys Ile
206       210             215           220
208 Gly Ser Gly Pro Asp Gly Lys Tyr Cys Thr Val Thr Gly Ser Thr Thr
209 225             230             235             240
211 Ser Cys
215 <210> SEQ ID NO: 5
216 <211> LENGTH: 244
217 <212> TYPE: PRT
218 <213> ORGANISM: Fusarium solani f. sp. pisi
220 <400> SEQUENCE: 5
221 Met Lys Ala Ser Ala Leu Ile Ile Ala Ala Val Thr Gly Ala Ser Ala
222  1           5               10              15
224 Ala Val Thr Thr Val Leu Pro Ala Ser Ala Gly Val Gln Ser Glu Pro
225           20              25              30
227 Thr Ala Ile Pro Val Arg Lys Gly Asp Lys Tyr Asn Gly Gly Met Lys
228           35              40              45
230 Arg Phe Val Arg Asn Pro Thr Thr Cys Lys Asp Gln Tyr Glu Thr Gly
231       50              55              60
233 Glu Lys Asp Ala Ser Phe Ile Leu Glu Asp Gly Ala Thr Leu Ser Asn
234  65              70              75              80
236 Val Ile Ile Asp Arg Ser Ser Gly Glu Gly Val His Cys Lys Gly Thr
237               85              90              95
239 Cys Thr Leu Asn Asn Val Trp Trp Ala Asp Val Cys Glu Asp Ala Ala
240           100             105             110
242 Thr Phe Lys Gln Lys Ser Gly Thr Ser Thr Ile Asn Gly Gly Gly Ala
243           115             120             125
245 Phe Ser Ala Gln Asp Lys Val Leu Gln Phe Asn Gly Arg Gly Thr Leu
246       130             135             140
248 Asn Val Asn Asp Phe Tyr Val Gln Asp Tyr Gly Lys Leu Val Arg Asn
249 145             150             155             160
251 Cys Gly Asn Cys Glu Gly Asn Gly Gly Pro Arg Asn Ile Asn Ile Lys
252               165             170             175
254 Gly Val Val Ala Lys Asn Gly Gly Glu Leu Cys Gly Val Asn His Asn
255           180             185             190
257 Tyr Gly Asp Val Cys Thr Ile Thr Asp Ser Cys Gln Asn Lys Gly Lys
258           195             200             205
260 Ser Cys Gln Ala Tyr Thr Gly Asn Asp Gln Lys Lys Glu Pro Pro Lys
261       210             215             220
263 Phe Gly Pro Ala Gly Asp Asn Gly Lys Ser Cys Leu Val Lys Ser Leu
264 225             230             235             240
266 Arg Thr Asn Cys
270 <210> SEQ ID NO: 6
271 <211> LENGTH: 215
272 <212> TYPE: PRT
273 <213> ORGANISM: Fusarium solani f. sp. pisi
275 <400> SEQUENCE: 6
276 Met Ala Cys Leu Gly Tyr Thr Gly Gly Val Pro Lys Pro Thr Asp His
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RAW SEQUENCE LISTING   DATE: 04/25/2003
PATENT APPLICATION: US/09/596,958A   TIME: 14:44:33

Input Set : A:\C32861.app
Output Set: N:\CRF4\04252003\I596958A.raw

```
277   1             5              10             15
279 Ile Ser Asn Ser Lys Val Ile Glu Val Lys Ala Gly Gln Val Tyr Asp
280              20             25             30
282 Gly Lys Trp Ala Lys Tyr Asp Arg Gly Ser Gly Ala Cys Lys Gly Gln
283          35             40             45
285 Asn Glu Gly Gly Asp Lys Asp Ala Val Phe Leu Leu His Glu Gly Ala
286      50             55             60
288 Thr Leu Lys Asn Val Ile Ile Gly Lys Asp Gln Ser Glu Gly Val His
289  65             70             75             80
291 Cys Lys Gly His Cys Thr Leu Glu Phe Val Trp Phe Glu Asp Val Cys
292              85             90             95
294 Glu Asp Ala Ile Ser Ile Ala Gly Lys Glu Ser Trp Ile Ile Gly Gly
295          100            105            110
297 Gly Ala Tyr His Ala Ser Asp Lys Val Val Gln His Asn Gly Cys Gly
298          115            120            125
300 Thr Val Asn Ile Ile Asn Phe Tyr Val Glu Asp Tyr Gly Lys Leu Tyr
301      130            135            140
303 Arg Ser Cys Gly Asn Cys Ser Lys Gln Cys Lys Arg Asn Val Tyr Ile
304 145            150            155            160
306 Glu Gly Val Thr Ala Lys Asn Gly Gly Glu Leu Ala Gly Ile Asn Ala
307              165            170            175
309 Asn Tyr Gly Asp Thr Ala Thr Leu Lys Asn Val Cys Ala Asp Ala Lys
310          180            185            190
312 Gln Lys Cys Thr Met Tyr Asn Gly Cys Ala Gly Gly Cys Glu Pro Lys
313          195            200            205
315 Lys Ile Gly Ala Cys Pro Ala
316      210            215
319 <210> SEQ ID NO: 7
320 <211> LENGTH: 217
321 <212> TYPE: PRT
322 <213> ORGANISM: Fusarium solani f. sp. pisi
324 <400> SEQUENCE: 7
325 Met Ala Cys Leu Gly Tyr Thr Gly Gly Val Pro Lys Ala Thr Gly Ser
326  1             5              10             15
328 Lys Ser Leu Ser Ala Pro Lys Thr Leu Lys Lys Gly Glu Val Phe Asp
329              20             25             30
331 Ala Gly Trp Val Arg Tyr Asp Arg Gly Val Lys Cys Ser Gly Gln Ala
332          35             40             45
334 Glu Gly Gly Ser Lys Asp Ala Val Phe Ile Leu Glu Glu Gly Ala Thr
335      50             55             60
337 Leu Arg Asn Val Ile Ile Gly Ala Asn Gln Arg Glu Gly Ile His Cys
338  65             70             75             80
340 Lys Gly Ser Cys Asn Ile Glu Phe Ala Trp Phe Glu Asp Val Cys Glu
341              85             90             95
343 Asp Ala Ile Ser Ile Leu Gly Ser Gly Thr Ala Asn Ile Ile Gly Gly
344          100            105            110
346 Gly Ala Tyr His Ala Ser Asp Lys Val Ile Gln His Asn Gly Cys Gly
347          115            120            125
349 His Val Asn Ile Val Asn Phe Tyr Ala Asn Asp Tyr Gly Lys Val Tyr
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RAW SEQUENCE LISTING ERROR SUMMARY   DATE: 04/25/2003
PATENT APPLICATION: US/09/596,958A   TIME: 14:44:34

Input Set : A:\C32861.app
Output Set: N:\CRF4\04252003\I596958A.raw

Please Note:
Use of n and/or Xaa have been detected in the Sequence Listing. Please review the
Sequence Listing to ensure that a corresponding explanation is presented in the <220>
to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:3; N Pos. 8,9,10,11,13,14,15,16,17,18,19,20,21,22
Seq#:10; Xaa Pos. 3,5,6,7,9,10,11,13,14,19,20,24,25,26,27,29,31,32,33,34,36
Seq#:10; Xaa Pos. 39,41,47,60,64,65,66,67,74,76,78,93,94,95,96,97,100,101
Seq#:10; Xaa Pos. 102,105,106,107,109,114,123,126,128,129,130,133,134,135
Seq#:10; Xaa Pos. 136,139,140,146,153,154,156,158,159,161,163,165,166,167
Seq#:10; Xaa Pos. 170,171,173,174,175,176,177,178,182,184,186,193,195,196
Seq#:10; Xaa Pos. 197,199,200,201,202,203,204,205,207,208,209,211,212,214
Seq#:10; Xaa Pos. 216,218,221,223,224,226,228,229,230